

APPENDIX F:
FLORAL ANALYSIS REPORT

NANCY ASCH SIDELL—ARCHEOBOTANICAL CONSULTING

WORKPLAN

Flotation samples and hand-picked samples are preselected by the principal investigator to provide a representative cross section from each component of a site. It is requested that flotation samples be thoroughly dry with heavy and light fractions combined or packaged together in a larger bag. "Hand-picked" samples, including C-14 samples, should be washed and dried before submittal.

In the archeobotanical laboratory, all samples are sieved through 4 mm, 2 mm, 1 mm, and 0.5 mm screens prior to analysis. Uncarbonized plant remains and other contaminants including coal are removed before weighing charcoal with an electronic balance accurate to 0.0001 g.

Charcoal larger than 2 mm (>2 mm) is sorted using a binocular microscope at 7x magnification and evaluated quantitatively by counting fragments. Large samples are divided using a riffle sampler to produce a subsample of 400-600 pieces for quantitative analysis. Charcoal 0.5-2 mm is scanned for presence/absence of all categories and seeds are removed. Sorting of wood charcoal into types is conducted on a less intensive scale than for other plant remains. Generally 20 fragments >2 mm are examined at 30-600x magnification for wood charcoal analysis. In a sample with a great variety of wood types or in one likely to be destroyed by dating, 30 fragments may be analyzed.

From counts of the charcoal >2 mm, the percentage occurrence of charcoal types by weight can be approximated.¹ Data summaries are presented for individual samples and for samples grouped by feature type and/or cultural affiliation. Separate tables are presented for wood identifications, nutshell identifications, and seed identifications, both unit identifications and percentage composition of groups of samples. Various statistical indices are also calculated, and comparisons are made with other sites in the region. Habitat reconstructions are based on soil maps, modern vegetation reconnaissance, and the archeological plant remains.

All charcoal categories are labeled and stored in 2" x 2" or larger ziplock bags. Seed specimens (exclusive of nutshell) are packaged in small polyethylene capsules. Unknown seed types are photographed and described.

¹ Extensive testing at the Center for American Archeology for sites in Illinois has shown that this method gives results closely comparable to complete sorting and weighing of samples. Quantification by enumeration of large-fraction (>2 mm) contents has two significant advantages over weighing and complete sorting: it is much faster, and identifications are more reliable because the larger fragments more often have diagnostic characteristics.

**SR 1 NORTH FREDERICA GRADE SEPARATED INTERCHANGE PROJECT
FLORAL REMAINS**

by

Nancy Asch Sidell

Prepared for A.D. Marble & Company

INTRODUCTION

The Phase I/II SR 1 North Frederica Grade Separated Interchange Project (hereafter referred to as Frederica Interchange site) is located in Frederica, Kent County, Delaware. The site was adjacent to marshlands surrounding Spring Creek and its junction with Murderkill River. Archaeological testing yielded numerous prehistoric features, ceramic sherds spanning the Woodland period, projectile points suggesting Middle Archaic through Late Woodland occupation, and a variety of tools, debitage, and other artifacts (Scott A. Emory, personal communication). Seven samples from seven features possibly dating from 1000 BC - 1600 AD were submitted for analysis.

According to Braun (1950), central Delaware was located in the Atlantic Slope Section of the oak-pine forest region. In Delaware, there may have originally been very little pine in the forests, and there was probably a distinctive lowland forest along the streams.

METHODS OF RECOVERY AND ANALYSIS

The plant remains were recovered by use of flotation from 1-1.25 liter soil samples. In the archeobotanical laboratory, the samples were sieved through 2 mm and 0.5 mm screens. Contaminants were removed before weighing charcoal with an electronic balance accurate to 0.0001 g. Charcoal larger than 2 mm was sorted and quantified by counting fragments; charcoal 0.5-2 mm was scanned for presence/absence of rare categories and carbonized seeds. Most of the charcoal surfaces tended to be obscured by thin clay skins, making identification difficult. From counts of the charcoal larger than 2 mm, the percentage occurrence of charcoal types by weight can be approximated. Uncarbonized plant remains were assumed to be more recent inclusions and were not tabulated.

For wood charcoal, the usual objective is to identify 20 fragments larger than 2 mm per sample. This was not possible at Frederica Interchange site because the amount of wood charcoal was very small and the smallest wood fragments could not be accurately identified. The transverse section was studied at 30-70X magnification after manually breaking the charcoal to obtain a clean section.

SAMPLE COMPOSITION

Plant remains from the Frederica Interchange site are tabulated and summarized in Table 1. A total of only 2.3 grams of charcoal from seven samples was submitted for analysis. The plant remains consisted of hickory nutshell, acorn shell, wood, bark, twig, pitch, and unknown fragments. The unknowns were mostly poorly preserved fragments coated with thin clay skins, which hampered identification.

Wood

At most archaeological sites, the samples contain a variety of wood types and it is assumed that the nearest available deadwood was collected for firewood. Assuming deadwood to be approximately proportional to the forest composition, it is possible to speculate on the composition of the forest growing near the site. Out of 40 wood charcoal fragments identified at Frederica Interchange site, there were 50% hickory, 42.5% oak (both red oak group and white oak group types), and 7.5% unidentifiable due to poor preservation.

Nutshell

Two types of nutshell were recovered from the Frederica Interchange site: thick-shelled hickory and acorn. The thick-shelled hickory was found in five of the seven samples, and acorn in one, even though the samples were very small. Altogether, 21 nutshell fragments larger than 2 mm were recovered from the seven samples, yielding a high nutshell index of 7.7 fragments of nutshell per gram of charcoal.

DISCUSSION

Very few plant remains were recovered from the Frederica Interchange site, in part because the volume of soil floated was quite small. Wood charcoal, bark, twig, and pitch/pitchy wood comprised 77% of the charcoal. There was a high percentage of wood types that would be found in an oak-hickory plant community (92.5%, or 100% if unidentifiable wood is disregarded), reflecting the site's location in an upland forest in the oak-pine forest region. However, there was very little difference in elevation between upland and lowland areas near Frederica Interchange site. If the sample of charcoal had been larger, it is possible that there would have also been species representative of the nearby bottomland forest.

Overall, 15.4% of the plant remains consisted of nutshell, mostly thick-shelled hickory. Nutshell was found in five of the seven samples, and the overall nutshell index was very high (7.7 fragments of nutshell per gram of charcoal). The presence of such a high density and ubiquity of nutshell is presumably the result of utilization of the nutmeat for food. The types of thick-shelled hickory that grow in Kent County are *Carya glabra* (pignut hickory), *C. tomentosa* (mockernut hickory), and *C. ovata* (shagbark hickory) (Little 1971, 1977). Other types of nuts that might have been available near the site are *C. cordiformis* (bitternut hickory), *Castanea dentata* (chestnut), *Fagus grandifolia* (beechnut), and *Juglans nigra* (black walnut).

The high density of nutshell (7.7 fragments larger than 2 mm per gram of charcoal) corresponded with a high proportion of nut trees represented in the wood charcoal (92.5% or more). This finding is consistent with results from analysis of sites in New England, New York, [New Jersey,] and Pennsylvania where there is generally a direct relationship between the amount of oak and hickory wood charcoal and the frequency of nutshell at sites in each area except Maine. This is thought to indicate that nut resources were used for food whenever they were available near a site (Asch Sidell 2002).

No seeds were recovered from Frederica Interchange site. Besides being useful for subsistence analysis, the variety and density of seeds recovered are important in reconstructing the type of vegetation that grew near the site. In Phase III testing, it is recommended that flotation sample size be increased to about 4 liters, if possible, to increase the likelihood of recovering seeds, tubers, cultivated plants, and more types of nutshell.

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Table 1. SR 1 North Frederica Grade Separated Interchange Project: Carbonized Plant Remains Feature 1

Portion S 1/2	SE 1/4	N 1/2	NW 1/4	NE 1/4	S 1/2	3	5a	8	10	11	Total	%
Coordinates	N575,E540	N570,E524	N621,E588	N620,5,E588	N561,E589	N661,E584	N630,E628-629					
Depth (cmbd)	49-59	80-90	76-81	95-100	70-80	55-65	50-60					
Soil sample no.	18	4	16	14	3	12	9					
Feature type	Large pit	Large pit	Pit?	Stain in 5a	Large pit	Large pit	Small stain					
SAMPLE WEIGHT (g)												
>2 mm	0.06	0.01	0.55	0.29	0.04	0.57	0.77	2.29				
0.5-2 mm	0.02	0.02	0.10	0.08	0.05	0.11	0.05	0.43				
Total	0.02	0.02	0.10	0.08	0.05	0.11	0.05	2.72				
SAMPLE COMPOSITION (>2 mm ct.)												
Nutshell												
Acorn	-	-	-	-	-	2	-	2	1.47			
Hickory	-	(1)	5	-	(4)	3	11	19	13.97			
Wood 5	2	29	22	3	-	27	88	64.71				
Bark 2?	-	6?	2?	-	uncarb.	1	-	11	8.09			
Twig	-	-	1	-	-	-	1	0.74				
Pitch	-	1	1	-	2	1	5	3.68				
Unknown	-	-	-	3	-	6	1	10	7.35			
Total >2 mm	7	2	41	29	3	14	40	136	100.00			
WOOD IDENTIFICATIONS												
Carya spp., hickory	-	2	7	-	2	-	-	9	20	50.00		
Quercus spp., oak	3	-	-	-	1	-	-	-	4	10.00		
Red oak group	1	-	2	2	2	2	4	1	12	30.00		
White oak group	1	-	-	-	-	-	-	-	1	2.50		
Unidentifiable	-	-	1	-	1	1	-	3	7.50			
Total 5	2	10	5	3	5	10	40	100.00				

SUMMARY STATISTICS

Nutshell index (No. frags >2 mm/g)

Seed index (No. seeds >0.5 mm/g)

7.7

0

Note: Parentheses indicate count in 0.5-2 mm charcoal. Soil sample volume was 1-1.25 liter. Some of the bark in Feature 5a was questionable.